Hydrocarbon Processing

1976 ANNUAL EDITORIAL INDEX

Volume 55

ABSORPTION
Solve more distillation problems (Part 5) ..... Jan. 137
Better data for amine treating ..... Feb. 87
Extraction variables defined ..... Mar. 117
Multi-temps give better control ..... Mar. 127
Gas men look at technical needs ..... Apr. 69
Remove carbon dioxide with Selexol ..... Apr. 73
Startup of a sour gas plant ..... Apr. 90
Low-pressure vapor-liquid trays ..... Apr. 97
NPRA '75 panel views processes ..... Apr. 109
Improve crude unit operation ..... May 81
Save energy: Better column control ..... May 122
ROSE process improves resid feed ..... May 125
Compare CO production methods ..... May 149
Erratum ..... *July 67*
Conserve energy . . . Refrigerate with waste heat ..... May 173
Use solvent to separate micron-sized particles from liquid streams ..... May 191
Solve more distillation problems (Part 6) ..... June 125
Re-refining adds furfural stage ..... Aug. 123
When using dimethyl sulfoxide (Part 1) ..... Aug. 127
Refining Handbook ..... Sept. 103
Program calculators for design study ..... Sept. 261
Recover acetylene in olefins plants ..... Nov. 151
Liquefy coal to petrochemical feed ..... Nov. 229
When using dimethyl sulfoxide (Part 2) ..... Nov. 237
Better control for C3/C4 split ..... Nov. 240

ACETALDEHYDE see ALDEHYDES
ACETYLENE
Recover acetylene in olefins plants ..... Nov. 151
ACID GASES
Better data for amine treating ..... Feb. 87
Gas men look at technical needs ..... Apr. 69
Remove carbon dioxide with Selexol ..... Apr. 73
Startup of a sour gas plant ..... Apr. 90
Refinery odor control ..... Apr. 121
Compare CO production methods ..... May 149
Erratum ..... *July 67*
Treat propane for COS removal ..... July 137
Remove NO_x from HNO_3 tail gas ..... Aug. 101
Refining Handbook ..... Sept. 103
LUCAS process cleans lean H_2S streams ..... Oct. 110
ACIDS/CARBOXYLIC/
Make glycerine via peracetic acid ..... Nov. 139
Make propylene oxide direct ..... Nov. 102
Liquid-phase oxidation—Hydrocarbons to petrochemicals ..... Nov. 247
ACRYLICS
Butadiene: A viable raw material? ..... Feb. 95
ACTIVATED CARBON
Regenerate granular carbon ..... May 157
ADDITIVES
What to follow if . . . your goal is effective fouling control ..... July 153
More about antifoulants ..... July 161
Refining Handbook ..... Sept. 103
ADIPIC ACID
Butadiene: A viable raw material ..... Feb. 95

ADSORPTION
Regenerate granular carbon ..... May 157
Refining Handbook ..... Sept. 103
Adsorption for vapor control ..... Sept. 241
Spent oil reclaimed without acid ..... Dec. 130
AERATORS
Save energy—Use O_2 on wastes ..... July 96
ALCOHOLS
Air best for formaldehyde and maleic ..... Mar. 90
Make plasticizer alcohols this way ..... Apr. 127
Use methanol converter reaction heat ..... May 165
Low-lead fuel with MTBE and C_4 alcohols ..... July 121
Hydroformylate propylene at low pressure ..... Sept. 247
Ammonia: Coal versus gas ..... Nov. 97
Make glycerine via peracetic acid ..... Nov. 139
Make SCP from ethanol ..... Nov. 113
Make methanol by three phase reaction ..... Nov. 122
Make ethylene from ethanol ..... Nov. 125
Liquid-phase oxidation—Hydrocarbons to petrochemicals ..... Nov. 247
ALDEHYDES
Air best for formaldehyde and maleic ..... Mar. 90
Acetaldehyde via air or oxygen ..... Mar. 97
Hydroformylate propylene at low pressure ..... Sept. 247
Make glycerine via peracetic acid ..... Nov. 139
Make propylene oxide direct ..... Nov. 102

ALKYLATION
Cheapest route to phenol....Mar. 91
NPRA '75 panel views processes....Apr. 109
Refining Handbook....Sept. 103
ALLOYS see METALS
AMINES
Better data for amine treating....Feb. 87
Butadiene: A viable raw material?....Feb. 95
Refining Handbook....Sept. 103
Which route to aniline?....Nov. 145
AMMONIA
Recycle H_2 in NH_3 purge gas....Jan. 103
Remove NO_x from HNO_3 tail gas....Aug. 101
Clean up urea plant effluent....Aug. 111
Ammonia: Coal versus gas....Nov. 97
Which route to aniline....Nov. 145
AMMONOLYSIS
Which route to aniline....Nov. 145
ANALYZING see also INSTRUMENTATION
Sulfur in world crudes....Feb. 73
System samples LNG accurately....Apr. 83
New approach to . . . Piping system weight analysis....Apr. 195
Chromatograph gives boiling point....May 205
Specify shop testing to . . . Improve compressor reliability....June 135
What to follow if . . . your goal is effective fouling control....July 153
New techniques in overcoming electrical runout....Aug. 131
Electrical runout in rotating machinery..Aug. 133
Microbiology for oil people . . . Corrosion in natural water....Aug. 148
Escape piping vibrations while designing..Oct. 152
Evaluate materials using new non-destructive test method....Oct. 159
Can you justify hydraulic turbines?....Oct. 163
Vibration energy method for rotor dynamic optimization....Nov. 261
Aerodynamics for . . . compressor's performance....Dec. 125
Qualify vessel integrity with acoustic emission analysis....Dec. 132
ANHYDRIDES
Air best for formaldehyde and maleic..Mar. 90
ANILINE
Which route to aniline?....Nov. 145
ANTIKNOCK RATING
NPRA '75 panel views processes....Apr. 109
Emission vs. conservation update....June 93
Erratum....*Aug. 69*
Low-lead fuel with MTBE and C_4 alcohols....July 121
Refining Handbook....Sept. 103
AROMATICS
What affects cat reformer yields....Jan. 95
Olefins production by gas oil cracking (Part 2C)....Jan. 149
Butadiene: A viable raw material?....Feb. 95
Air best for formaldehyde and maleic...Mar. 90
Cheapest route to phenol....Mar. 91
NPRA '75 panel views processes....Apr. 109
What is feedstock worth?....Apr. 143
To save energy when reforming....May 75
To 1985: U.S. benzene supply/demand..July 127
Canada's role in petrochemicals....Aug. 171
Refining Handbook....Sept. 103
Adsorption for vapor control....Sept. 241
Prospects for marketing coal gasification byproducts....Sept. 253
Which route to aniline?....Nov. 145
When using dimethyl sulfoxide (Part 2)....Nov. 237
ASPHALT
Refining handbook....Sept. 103
AZEOTROPES
Extraction variables defined....Mar. 117

BENZENE
Air best for formaldehyde and maleic...Mar. 90
To 1985: U.S. benzene supply/demand..July 127
Canada's role in petrochemicals....Aug. 171
Which route to aniline?....Nov. 145
Benzene: Outlook through 1980....Nov. 217
BLENDING
Low-lead fuel with MTBE and C_4 alcohols....July 121
BOILERS see HEAT TRANSFER
BOILING POINT
Chromatograph gives boiling point....May 205
Predict VP of "undefined" fractions..Dec. 121
BOXSCORE
Section 2....Feb., June, Oct.
BUTADIENE
Butadiene: A viable raw material?....Feb. 95
What price Western European butadiene?....May 143
U.S.A. butadiene—Coproduct or dehydro?....Oct. 119
BUTANE
Liquid-phase oxidation—Hydrocarbons to petrochemicals....Nov. 247
BUTENES
Refining Handbook....Sept. 103

CARBONYLATION
Loop reactors: Better gas/liquid contact..June 99
CATALYSTS
For EO: air and oxygen equal....Mar. 69
For EO: air or oxygen?....Mar. 73
Oxygen best for EO....Mar. 78
Air or oxygen for VCM....Mar. 85
Air best for formaldehyde and maleic...Mar. 90
Cheapest route to phenol....Mar. 91
Acetaldehyde via air or oxygen....Mar. 97
NPRA '75 panel views processes....Apr. 109
To save energy when reforming....May 75
Metals removal for FCC catalyst....May 133
Compare CO production methods....May 149
Erratum....*July 67*
Remove NO_x from HNO_3 tail gas....Aug. 101
Olefin disproportionation—New route to petrochemicals....Aug. 119
Refining Handbook....Sept. 103
Lower olefins via Fischer-Tropsch....Nov. 105
Gasify coal for syn gas....Nov. 171
Which route to aniline?....Nov. 145
Liquid-phase oxidation—Hydrocarbons to petrochemicals....Nov. 247
CATALYTIC CRACKING
NPRA '75 panel views processes....Apr. 109
Metals removal for FCC catalyst....May 133
Save crude: feed resid to FCC....July 105
Refining Handbook....Sept. 103
CATALYTIC REFORMING see REFORMING
CHLORINATION
Oxygen gives lowest cost VCM....Mar. 81
Air or oxygen for VCM....Mar. 85
Loop reactors: Better gas/liquid contact..June 99
CHLOROETHANES
Incineration: Lowest cost HCl recovery..Aug. 117
CHLOROMETHANES
Incineration: Lowest cost CHl recovery..Aug. 117
CHROMATOGRAPHY
Chromatograph gives boiling point....May 205
COAL
Solid-phase hydrogenation cuts cost....Jan. 131
Consider ash disposal....Feb. 107
In situ recovery processing....May 117
Compare CO production methods....May 149
Erratum....*July 67*
Use solvent to separate micron-sized particles from liquid streams....May 191
From refining to coal gasification . . . New steels for fuel processing....June 89
Sasol II: South Africa's oil-from-coal plant....July 56-F
Limits to survival....July 71
Clean fuels from coal are expensive....July 85
Economics of *in situ* coal recovery....July 109
Prospects for marketing coal gasification byproducts....Sept. 253
Lurgi/Ruhrgas shale oil process....Sept. 269
Ammonia: Coal versus gas....Nov. 97
Gasify coal for syn gas....Nov. 171
Gasify coal for petrochemicals....Nov. 134
State-of-the-art—Coal liquefaction....Nov. 221
Liquefy coal to petrochemical feed....Nov. 229
COKING
Refining Handbook....Sept. 103
Prospects for marketing coal gasification byproducts....Sept. 253
Steam cracker vacuum residue....Nov. 93
Liquefy coal to petrochemical feedstock....Nov. 229
COMBUSTION
Emmission vs. conservation update....June 93
Erratum....*Aug. 69*
COMPRESSORS
Failure analysis of high speed couplings..Jan. 77
Techniques for alignment of rotating equipment....Jan. 81
How to uprate turboequipment by optimized coupling selection....Jan. 87
A practical vibration primer (Part 5)....Apr. 171
Use keyless couplings for large compressor shafts....Apr. 181
Specify shop testing to . . . Improve compressor reliability....June 135
New materials solve recip. compressor problems....July 147
New techniques in overcoming electrical runout....Aug. 131
Electrical runout in rotating machinery..Aug. 133
How compressor components affect performance....Sept. 273
Why dual ethylene unit compressors?....Oct. 135
A practical vibration primer (Part 6)...Oct. 141
Cut costs in olefin plants....Nov. 165
Vibration energy method for rotor dynamic optimization....Nov. 261
Aerodynamics for . . . compressor's performance....Dec. 125
COMPUTERS
Solve more distillation problems (Part 5)..Jan. 137
Approximate LMTD....Feb. 125
Multi-temps give better control....Mar. 127
Improve crude unit operation....May 81
Save energy: Better column control....May 122
Solve more distillation problems (Part 6)....June 125
Predict heat capacity more accurately...Aug. 153
Program calculators for design study....Sept. 261
Vibration energy method for rotor dynamic optimization....Nov. 261
Tank truck loading optimized....Dec. 105
Predict VP of "undefined" fractions..Dec. 121
Qualify vessel integrity with acoustic emission analysis....Dec. 132
CONSTRUCTION BOXSCORE
Section 2....Feb., June, Oct.
COOLING TOWERS see HEAT TRANSFER
CORROSION
Prevent overlay failures: Check weld procedure execution....May 103
Variables affecting corrosion of sour water strippers....May 104
Try improved calorized steel....June 75
Developments in wrought alloys....June 81
For high temperature . . . Tests show Cr-Ni alloy superior....June 84
From refining to coal gasification . . . New steels for fuel processing....June 89
New materials solve recip. compressor problems....July 147
Internal corrosion in floating roof gasoline tanks....Aug. 145
Control corrosion in sour water system..Aug. 147
Microbiology for oil people . . . Corrosion in natural water....Aug. 148
Evaluate materials using new nondestructive test method....Oct. 159
What's new in urea technology?....Nov. 160
COSTS
Recycle H_2 in NH_3 purge gas....Jan. 103
Pitfalls in profitability analysis....Jan. 111
Solid-phase hydrogenation cuts cost....Jan. 131
Butadiene: A viable raw material?....Feb. 95
For EO: air and oxygen equal....Mar. 69
For EO: air or oxygen?....Mar. 73
Oxygen best for EO....Mar. 78
Oxygen gives lowest cost VCM....Mar. 81
Air or oxygen for VCM....Mar. 85
Cheapest route to phenol....Mar. 91
Acetaldehyde via air or oxygen....Mar. 97
A new approach to . . . economic insulation thickness....Mar. 137
Propylene dimer: fuel or chemical....Apr. 105
Make plasticizer alcohols this way....Apr. 127
What is feedstock worth?....Apr. 143
Predict prices with inflation....Apr. 151
Improve crude unit operation....May 81
Conserve lube oil: Re-refine....May 86
Erratum....*July 67*
Energy cost of NO_x control....May 95
Better data saves energy....May 115
Design techniques for energy conservation....May 119
ROSE process improves resid feed....May 125
Metals removal for FCC catalyst....May 133
What price Western European butadiene?....May 143
Compare CO production methods....May 149
Erratum....*July 67*
Regenerate granular carbon....May 157
Use methanol converter reaction heat...May 165
Conserve energy . . . Refrigerate with waste heat....May 173
Lower fuel bill . . . Upgrade natural gas engines....May 211
How to estimate royalties....May 233
Limits to survival....July 71
Clean fuels from coal are expensive....July 85
Save energy—Use O_2 on wastes....July 96
Economics of *in situ* coal recovery....July 109
Propylene: Future supply/demand....July 131
Remove NO_x from HNO_3 tail gas....Aug. 101
Clean up urea plant effluent....Aug. 111
Incineration: Lowest cost HCl recovery..Aug. 117
Refining Handbook....Sept. 103
Adsorption for vapor control....Sept. 241
Prospects for marketing coal gasification byproducts....Sept. 253
Lurgi/Ruhrgas shale oil process....Sept. 269
Wastewater requirements multiply solids problems....Oct. 98
Which route to olefins from VGO?....Oct. 123
Mixed refrigerant for ethylene....Oct. 129
Why dual ethylene unit compressors?..Oct. 135
Can you justify hydraulic turbines?....Oct. 163
Steam cracker vacuum residue....Nov. 93
Ammonia: Coal versus gas....Nov. 97
Suspension PVC in large reactors....Nov. 117
Make methanol by three phase reaction....Nov. 122
Make ethylene from ethanol....Nov. 125
Gasify coal for petrochemicals....Nov. 134
Which route to aniline?....Nov. 145
Recover acetylene in olefins plants....Nov. 151
Build large LDPE plants....Nov. 155
Cut costs in olefin plants....Nov. 165
New trends in joint ventures?....Nov. 179
Saudi Arabia building costs....Nov. 189
Energy price impacts designs....Nov. 205
Propylene: Outlook through 1985....Nov. 213
Benzene: Outlook through 1980....Nov. 217
State-of-the-art—coal liquefaction....Nov. 221
Liquefy coal to petrochemical feed....Nov. 229
Cooling tower estimates made easy....Dec. 93
Steam management in a refinery....Dec. 71
Electricity: generate or buy?....Dec. 75
Tank truck loading optimized....Dec. 105
Planning for Mid-East petrochemicals..Dec. 115
COUPLINGS
Use keyless couplings for large compressor shafts....Apr. 181
CRACKING/CHEMICAL
Olefins production by gas oil cracking (Part 2C)....Jan. 149
Improved hot-gas expanders for cat cracker flue gas....Mar. 141
NPRA'75 panel views processes....Apr. 109
Olefins production by gas oil cracking (Part 3)....Apr. 161
Metals removal for FCC catalyst....May 133
More ethane from lesss gas....June 105

Save crude: feed resid to FCC.....July 105
Propylene: Future supply/demand.....July 131
Control corrosion in sour water system..Aug. 147
Refining Handbook .....Sept. 103
DCPD: Abundant resin raw material..Sept. 235
Which route to olefins from VGO?.....Oct. 123
Mixed refrigerant for ethylene.....Oct. 129
Why dual ethylene unit compressors?...Oct. 135
Recover acetylene in olefins plants....Nov. 151
New route to ethylene:
Hydropyrolysis .....Nov. 176
Steam crack vacuum residue.....Nov. 93
Liquefy coal to petrochemical feed....Nov. 229

CRUDE OILS
Sulfur in world crudes.....Feb. 73
Sulfur split among products.....Feb. 77
Startup of a sour gas plant.....Apr. 90
Limits to survival .....July 71
Refining Handbook .....Sept. 103

CRYOGENICS see REFRIGERATION

CUMENE
Canada's role in petrochemicals.....Aug. 171

CYCLOPARAFFINS
What affects cat reformer yields.....Jan. 95
Canada's role in petrochemicals.....Aug. 171
Liquid-phase oxidation—Hydrocarbons to petrochemicals .....Nov. 247

DEASPHALTING
ROSE process improves resid feed.....May 125
Refining Handbook .....Sept. 103

DEHYDROGENATION
Refining Handbook .....Sept. 103
U.S.A. butadiene—Coproduct or dehydro? .....Oct. 119

DESALTING
NPRA '75 panel views processes.....Apr. 109
Refining Handbook .....Sept. 103

DESIGN see SPECIFIC EQUIPMENT

DESULFURIZATION
Olefins production by gas oil cracking (Part 2C).....Jan. 149
Sulfur split among products.....Feb. 77
Startup of a sour gas plant.....Apr. 90
Refining Handbook .....Sept. 103
LUCAS process cleans lean H_2S streams .....Oct. 110
Which route to olefins from VGO?.....Oct. 123

DEWAXING
Refinery Handbook .....Sept. 103

DISPROPORTIONATION
Olefin disproportionation/New routes to petrochemicals .....Aug. 119

DISTILLATION
Solve more distillation problems (Part 5) .....Jan. 137
Multi-temps give better control.....Mar. 127
Startup of a sour gas plant.....Apr. 90
Low-pressure vapor-liquid trays.....Apr. 97
Improve crude unit operation.....May 81
Save energy: Better column control.....May 122
Solve more distillation problems (Part 6) .....June 125
Refining Handbook .....Sept. 103
Program calculators for design study...Sept. 261
Better control for C3/C4 split.....Nov. 240

DRYING
Refining Handbook .....Sept. 103
Make ethylene from ethanol.....Nov. 125

ECONOMICS see COSTS

ELASTOMERS
Select O-rings carefully.....Apr. 191

ELECTRICAL EQUIPMENT
How skin effect tracing works.....Dec. 90

EMISSIONS see ENVIRONMENT

EMPLOYES
Refiners can save energy, too.....July 91

ENGINES
Lower fuel bill . . . Upgrade natural gas engines .....May 211
Emissions vs. conservation update.....June 93
Erratum .....*Aug. 69*

ENTHALPY see THERMODYNAMICS

ENVIRONMENT
Consider ash disposal .....Feb. 107
Oil spill control (Part 1).....Feb. 121
Oxygen gives lowest cost VCM.....Mar. 81
Air or oxygen for VCM.....Mar. 85
Acetaldehyde via air or oxygen.....Mar. 97
Optimize the effluent system (Part 1)...Mar. 105
Oil spill control (Part 2).....Mar. 145
Make SNG from waste and biomass....Apr. 76
Converting seaweed to SNG.....Apr. 86
Startup of a sour gas plant.....Apr. 90
Refinery ordor control .....Apr. 121
Select O-rings carefully.....Apr. 191
Tests quantity emissions from ship loadings .....Apr. 207
Optimize the effluent system (Part 2)...Apr. 213
Conserve lube oil: Re-refine.....May 86
Erratum .....*July 67*
Energy for wastewater treatment.....May 88
Cut wastewater treatment costs.....May 92
Energy cost of NO_x control.....May 95
In situ recovery processing.....May 117
Regenerate granular carbon.....May 157
Optimize the effluent system (Part 3)...May 221
Emission vs. conservation update.....June 93
Erratum .....*Aug. 69*
Optimize the effluent system (Part 4)...June 115
Save energy—Use O_2 on wastes.....July 96
Optimize the effluent system (Part 5)...July 113
Remove NO_x from HNO_3 tail gas.....Aug. 101
Clean up urea plant effluent.....Aug. 111
Incineration: Lowest cost HCl recovery .....Aug. 117
Re-refining adds furfural stagde.....Aug. 123
Optimize the effluent system (Part 6)...Aug. 137
Refining Handbook .....Sept. 103
Program calculators for design study....Sept. 261
What you need to know about environmental impact statements.....Oct. 87
Control NO_x emission from fixed fireboxes .....Oct. 94
Wastewater requirements multiply solids problems .....Oct. 98
Syncrude vows environmental responsibility .....Oct. 102
Advanced wastewater treatment process is effective .....Oct. 107
Use lead to block noise.....Oct. 112
LUCAS process cleans lean H_2S streams.Oct. 110
Suspension PVC in large reactors.....Nov. 117
Syngas process converts waste to SNG..Nov. 201
How to prevent cooling tower fog....Dec. 97
Blanket tanks for gas control.....Dec. 101
Spent oil reclaimed without acid.....Dec. 130

ESTERS
Make plasticizer alcohols this way.....Apr. 127
DCPD: Abundant resin raw material...Sept. 235

ETHANE
More ethane from less gas.....June 105

ETHERS
Low-lead fuel with MTBE and C_4 alcohols .....July 121

ETHYLENE see OLEFINS

ETHYLENE OXIDE
For EO: air and oxygen equal.....Mar. 90
For EO: air or oxygen?.....Mar. 73
Oxygen best for EO.....Mar. 78
U.S. EO/EG—Past, present and future.June 109

EUREKA PROCESS
Steam crack vacuum residue.....Nov. 93

EXCHANGERS see HEAT TRANSFER

EXPANDERS see TURBINES

EXPLOSIONS see SAFETY

EXTRACTION see ABSORPTION

FERMENTATION
Make SCP from ethanol.....Nov. 113

FILTRATION
Cut wastewater treatment costs.....May 92
Use solvent to separate micron-sized particles from liquid streams.....May 191

FIRES see SAFETY

FISHER-TROPSCH
Lower olefins via Fischer-Tropsch.....Nov. 105

FLUIDIZING
Make methanol by three phase reaction .....Nov. 122

FOG see ENVIRONMENT

FORECASTING
Will enough steel be in our future?.....Feb. 116
Soviet NG outlook to 1985.....Mar. 44-G
Cheapest route to phenol .....Mar. 91
Make plasticizer alcohols this way.....Apr. 127
For a given kinetic duty . . . Select optimum reactor quickly.....Apr. 135
Erratum .....*Aug. 69*
What is feedstock worth?.....Apr. 143
Predict prices with inflation.....Apr. 151
Conserve lube oil: Re-refine.....May 86
Erratum .....*July 67*
What price Western European butadiene? .....May 143
How to estimate royalties.....May 233
U.S. EO/EG—Past, present and future.June 109
Limits to survival .....July 71
To 1985: U.S. benzene supply/demand..July 127
Propylene: Future supply/demand.....July 131
Japan's petroleum industry—Its present and future .....Aug. 56-E
Mexico: Outlook for plastics?.....Aug 165
Mexico: A national energy model....Sept. 70-E
Forecast: Energy supply/demand.....Oct. 70-G
U.S.A. butadiene—Coproduct or dehydro? .....Oct. 119
Can you justify hydraulic turbines?.....Oct. 163
Ammonia: Coal versus gas.....Nov. 97
Which route to aniline?.....Nov. 145
New trends in joint ventures?.....Nov. 179
Propylene: Outlook through 1985.....Nov. 213
Benzene: Outlook through 1980.....Nov. 217
Planning for Mideast petrochemicals...Dec. 115

FORMALDEHYDE see ALDEHYDES

FOUNDATIONS
Design of skirt-mounted supports.....Apr. 199

FURFURAL
Re-refining adds furfural stage.....Aug. 123
Refining Handbook .....Sept. 103

FURNACES see HEAT TRANSFER

GASIFICATION
Consider ash disposal.....Feb. 107
Gas men look at technical needs.....Apr. 69
Make SNG from waste and biomass.....Apr. 76
In situ recovery processing.....May 117
Sasol II: South Africa's oil-from-coal plant .....July 56-F
Clean fuels from coal are expensive.....July 85
Economics of *in situ* coal recovery.....July 109
Prospects for marketing coal gasification byproducts .....Sept. 253
Lurgi/Ruhrgas shale oil process.....Sept. 269
Gasify coal for syn gas.....Nov. 171
Gasify coal for petrochemicals.....Nov. 134
Syngas process converts waste to SNG..Nov. 201
State-of-the-art—Coal liquefaction .....Nov. 221

GEARS
Use keyless couplings for large compressor shafts .....Apr. 181

GLYCERINE
Make glycerine via peracetic acid.....Nov. 139

GLYCOLS
U.S. EO/EG . . . Past, present and future .....June 109
Refining Handbook .....Sept. 103

GREASE see LUBRICANTS

HEAT TRANSFER
LNG rollover—update .....Jan. 119
Recover energy from furnace stacks....Jan. 127
Olefins production by gas oil cracking (Part 3) .....Apr. 161
A new approach to . . . economic insulation thickness .....Mar. 137
Energy cost of NO_x control.....May 95
Prevent overlay failures: Check weld procedure execution .....May 103
Titanium exchanger tubing works well in refinery service.....May 105
U.S. refineries conserve energy.....May 120
Regenerate granular carbon.....May 157
Use methanol converter reaction heat...May 165
Try improved calorized steel.....June 75
Loop reactor: Better gas/liquid contact..June 99
Refiners can save energy, too.....July 91
What to follow if . . . your goal is effective fouling control.....July 153
More about antifoulants.....July 161
Microbiology for oil people . . . Corrosion in natural water.....Aug. 148
Estimate ethylene furnace tube life.....Aug. 161
How plant operating decisions affect ethylene furnace tube life.....Aug. 162
Mixed refrigerant for ethylene.....Oct. 129
Cut costs in olefin plants.....Nov. 165
Energy price impacts design.....Nov. 205
Cooling tower estimates made easy....Dec. 93
How to prevent cooling tower fog....Dec. 97
Steam management in a refinery.....Dec. 71
Case history: A two burner boiler explosion .....Dec. 85
Electricity: generate or buy.....Dec. 75
How skin effect tracing works.....Dec. 90

HYDROCRACKING
Olefins production by gas oil cracking (Part 2C) .....Jan. 149
Refining Handbook .....Sept. 103
Which route to olefin from VGO?.....Oct. 123

HYDROGEN
What affects cat reformer yields.....Jan. 95
Recycle H_2 in NH_3 purge gas.....Jan. 103
Find hydrogen partial pressure.....Feb. 81
To save energy when reforming.....May 75
Design techniques for energy conservation .....May 119
Refining Handbook .....Sept. 103
Hydroformylate propylene at low pressure .....Sept. 247
Ammonia: Coal versus gas.....Nov. 97
Gasify coal for syn gas.....Nov. 171
New route to ethylene: Hydropyrolysis.Nov. 176
Which route to aniline?.....Nov. 145

HYDROGENATION
Refining Handbook .....Sept. 103
Which route to olefins from VGO?.....Oct. 123

HYDROTREATING
Olefins production by gas oil cracking (Part 2C) .....Jan. 149
Sulfur split among products.....Feb. 77
Find hydrogen partial pressure.....Feb. 81
NPRA '75 panel views processes.....Apr. 109
Refinery odor control.....Apr. 121
Metals removal for FCC catalyst.....May 133
Save crude: feed resid to FCC.....July 105
Re-refining adds furfural stage.....Aug. 123
Microbiology for oil people . . . Corrosion in natural water.....Aug. 148
Refining Handbook .....Sept. 103
Spent oil reclaimed without acid.....Dec. 130

INSTRUMENTATION
Control valve packing—some useful guidelines .....Jan. 91
New extraction control system for steam turbines .....Feb. 111
Multi-temps give better control.....Mar. 127
System samples LNG accurately.....Apr. 83
A practical vibration primer (Part 5)...Apr. 171
Select O-rings carefully.....Apr. 191
New approach to . . . Piping system weight analysis .....Apr. 195
Improve crude unit operation.....May 81
Save energy: better column control.....May 122
Use mass measurement for NGL.....May 186
Chromatograph gives boiling point.....May 205
Specify shop testing to . . . Improve compressor reliability .....June 135
Estimate ethylene furnace tube life.....Aug. 161
How plant operating decisions affect ethylene furnace tube life.....Aug. 162
Pipewall vibrations reveal . . . valve-generated noise? .....Oct. 147
Better control for C_3/C_4 split.....Nov. 240
Blanket tanks for gas control.....Dec. 101

INSULATION see HEAT TRANSFER

INTERNATIONAL TRADE
Petrochemical project development in the Middle East.....Jan. 56-E
Soviet NG outlook to 1985.....Mar. 44-G
Japan's petroleum industry—Its present and future .....Aug. 56-E

INVENTORIES
Tank truck loading optimized.....Dec. 105
ISOMERIZATION
Refining Handbook .....Sept. 103

KETONES
Cheapest route to phenol.....Mar. 91
Liquid-phase oxidation—Hydrocarbons to petrochemicals .....Nov. 247

LEGISLATION
Where the candidates stand (Part 1)..May 237
LIQUEFACTION
Use solvent to separate micron-sized particles from liquid streams.....May 191
Clean fuels from coal are expensive.....July 85
Stop O_2 reaction in LNG manufacture..Sept. 265
Lurgi/Ruhrgas shale oil process.....Sept. 269
State-of-the-art—Coal liquefaction .....Nov. 221
LIQUID NATURAL GAS (LNG)
LNG rollover—update .....Jan. 119
Gas men look at technical needs.....Apr. 69
System samples LNG accurately.....Apr. 83
Design plants using extended gas analyses .....May 177
Use mass measurement for NGL.....May 186
Stop O_2 reaction in LNG manufacture..Sept. 265
LIQUEFIED PETROLEUM GAS (LPG)
Treat propane for COS removal.....July 137
LUBRICANTS
Conserve lube oil: Re-refine.....May 86
Re-refining adds furfural stage.....Aug. 123
Refining Handbook .....Sept. 103
Spent oil reclaimed without acid.....Dec. 130

MAINTENANCE
Power tools for maintenance.....Jan. 73
Failure analysis of high speed couplings..Jan. 77
Control valve packing—some useful guidelines .....Jan. 91
"MBO" for maintenance operations.....Jan. 159
Select O-rings carefully.....Apr. 191
Specify performance testing to . . . Improve compressor reliability.....June 135
New techniques in overcoming electrical runout .....Aug. 131
Electrical runout in rotating machinery..Aug. 133
Internal corrosion in floating roof gasoline tanks .....Aug. 145
Erratum .....*Nov. 89*
Estimate ethylene furnace tube life.....Aug. 161
How plant operating decisions affect ethylene furnace tube life.....Aug. 162
A practical vibration primer (Part 6)...Oct. 141
Evaluate materials using new nondestructive test method.....Oct. 159
Steam management in a refinery.....Dec. 71
MANAGEMENT
Petrochemical project development in the Middle East.....Jan. 56-E
Recover energy from furnace stacks.....Jan. 127
"MBO" for maintenance operations.....Jan. 159
Continuing education (Part 1).....Jan. 167
Oil spill control (Part 1).....Feb. 121
Read a person like a slide rule.....Feb. 127
Continuing education (Part 2).....Feb. 143
Oil spill control (Part 2).....Mar. 145
Try "blue chip" profit sharing.....Mar. 165
Manage your time more wisely.....Mar. 179
Organize for energy conservation.....Apr. 221
Think like a professional.....Apr. 235
Save energy with the three M's.....May 108
To save energy, train 'coordinators'.....May 110
Get employe commitment to energy conservation .....May 113
Better data saves energy.....May 115
U.S. refineries conserve energy.....May 120
Where the candidates stand (Part 1)..May 237
Improve the use of engineers.....May 247
Prepare to work outside your country...May 265
Managing change (Part 1).....May 273
Where the candidates stand (Part 2)...June 141
Managing change (Part 2).....June 153
Limits to survival.....July 71
Refiners can save energy, too.....July 91
Manage beter with forecasting methods..July 165
The management of creativity.....July 180
What is good project management?.....Aug. 73
Be ready to build a superplant.....Aug. 77
Erratum .....*Oct. 85*
Cut costs with 'ROPM".....Aug. 83
Strengthen client-E/C relations.....Aug. 86
Productivity can be improved.....Aug. 89
Manage your equipment better.....Aug. 91
Proper planning pays off.....Aug. 94
Information resources .....Aug. 97
Engineering manpower reforms NOW!..Aug. 176
Attitude surveys can be useful.....Sept. 279
Engineers are united.....Sept. 288
Engineers are in rebellion.....Sept. 289
What you need to know about environmental impact statements.....Oct. 87
Control NO_x emission from fixed fireboxes .....Oct. 94
Wastewater requirements multiply solids problems .....Oct. 98
Syncrude vows environmental responsibility .....Oct. 102
Advanced wastewater treatment process is effective.....Oct. 107
Use lead to block noise.....Oct. 112
What makes a good engineering manager? .....Oct. 168
Why managers don't delegate.....Oct. 167
Train for energy conservation.....Oct. 201
Keep up with energy trends (Part 1)..Nov. 56-G
Saudi Arabia building costs.....Nov. 189
"Let's Help" program saves energy...Nov. 271
Appraisals can develop employes.....Nov. 279
Research project evaluation: Part 1...Dec. 137
Curtail artificial turnover.....Dec. 149
Keep up with energy trends (Part 2)..Dec. 54-F
If there's another embargo.....Dec. 54-JJ

MATERIALS HANDLING
Consider ash disposal.....Feb. 107
Tank truck loading optimized.....Dec. 105
METALS
Consider ash disposal.....Feb. 107
Will enough steel be in our future?.....Feb. 116
Prevent overlay failures: Check weld procedure execution .....May 103
Variables affecting corrosion of sour water strippers.....May 104
Titanium exchanger tubing works well in refinery service.....May 105
Try improved calorized steel.....June 75
Developments in wrought alloys.....June 81
For high temperature . . . Tests show Cr-Ni alloy superior.....June 84
New stainless for high temperatures....June 87
From refining to coal gasification . . . New steels for fuel processing.....June 89
Microbiology for oil people . . . Corrosion in natural water.....Aug. 148
Evaluate materials using new nondestructive test method.....Oct. 159
What's new in urea technology?.....Nov. 160
METHANE
Design plants using extended gas analyses .....May 177
Use mass measurement for NGL.....May 186
MIXING
Low-pressure vapor-liquid trays.....Apr. 97
MOLECULAR SIEVES
Refining Handbook .....Sept. 103

NATURAL GASES see also LIQUEFIED NATURAL GAS, METHANE, SUBSTITUTE NATURAL GAS
LNG rollover—update .....Jan. 119
Soviet NG outlook to 1985.....Mar. 44-G
Gas men look at technical needs.....Apr. 69
Remove carbon dioxide with Selexol....Apr. 73
Converting seaweed to SNG.....Apr. 86
Startup of a sour gas plant.....Apr. 90
Design plants using extended gas analyses .....May 177
Use mass measurement for NGL.....May 186
Limits to survival.....July 71
Stop O_2 reaction in LNG manufacture..Sept. 265
Ammonia: Coal versus gas.....Nov. 97
NITRIC ACID
Remove NO_x from HNO_3 tail gas.....Aug. 101
Which route to aniline?.....Nov. 145
NITRILES
Make aromatic nitriles this way.....Feb. 103
NITROGEN
Energy cost of NO_x control.....May 95
Control NO_x emission from fixed fireboxes .....Oct. 94
Use lead to block noise.....Oct. 112
Pipewall vibrations reveal . . . valve-generated noise .....Oct. 147
NOISE
Use lead to block noise.....Oct. 112
Pipewall vibrations reveal . . . valve-generated noise .....Oct. 147

ODOR
Refinery odor control.....Apr. 121
OLEFINS
Olefins production by gas oil cracking (Part 2C) .....Jan. 149
Butadiene: A viable raw material?.....Feb. 95
For EO: air and oxygen equal.....Mar. 69
For EO. air or oxygen?.....Mar. 73
Oxygen best for EO.....Mar. 78
Oxygen gives lowest cost VCM.....Mar. 81
Air or oxygen for VCM.....Mar. 85
Cheapest route to phenol.....Mar. 91
Acetaldehyde via air or oxygen.....Mar. 97
Propylene dimer: fuel or chemical.....Apr. 105
What is feedstock worth?.....Apr. 143
Olefins production by gas oil cracking (Part 3) .....Apr. 161
What price Western European butadiene? .....May 143
More ethane from less gas.....June 105
Propylene: Future supply/demand.....July 131
Olefin disproportionation—New routes to petrochemicals .....Aug. 119
Mexico: Outlook for plastics?.....Aug. 165
Canada's role in petrochemicals.....Aug. 171
Refining Handbook .....Sept. 103
Hydroformylate propylene at low pressure .....Sept. 247
U.S.A. butadiene—Coproduct or dehydro? .....Oct. 119
Which route to olefin from VGO?.....Oct. 123
Mixed refrigerant for ethylene.....Oct. 129
Why dual ethylene unit compressors?....Oct. 135
Make propylene oxide direct.....Nov. 102
Lower olefins via Fischer-Tropsch.....Nov. 105
Make ethylene from ethanol.....Nov. 125
Make glycerine via paracetic acid.....Nov. 139
Recover acetylene in olefins plants....Nov. 151
Build larger LDPE plants.....Nov. 155
Cut costs in olefin plants.....Nov. 165
New route to ethylene: Hydropyrolysis..Nov. 176
Propylene: Outlook through 1985.....Nov. 213
Liquefy coal to petrochemical feed.....Nov. 229
OXIDATION
For EO: air or oxygen?.....Mar. 73
Oxygen best for EO.....Mar. 78
Air best for formaldehyde and maleic...Mar. 90
Cheapest route to phenol.....Mar. 91
Stop O_2 reaction in LNG manufacture..Sept. 265
Make propylene oxide direct.....Nov. 102
Liquid-phase oxidation—Hydrocarbons to petrochemicals .....Nov. 247
OXYCHLORINATION
Oxygen gives lowest cost VCM.....Mar. 81
Air or oxygen for VCM.....Mar. 85
OXYGEN
For EO: air and oxygen equal.....Mar. 69
For EO: air or oxygen?.....Mar. 73
Oxygen best for EO.....Mar. 78
Oxygen gives lowest cost VCM.....Mar. 81
Air or oxygen for VCM.....Mar. 85
Acetaldehyde via air or oxygen.....Mar. 97
Save energy—Use O_2 on wastes.....July 96
Stop O_2 reaction in LNG manufacture..Sept. 265
Gasify coal for syn gas.....Nov. 171
Liquid-phase oxidation—Hydrocarbons to petrochemicals .....Nov. 247

PACKING see SEALS
PARPTIAL OXIDATION
Compare CO production methods.....May 149
Erratum .....*July 67*
Gasify coal for syn gas.....Nov. 171
PERACETIC ACID
Make propylene oxide direct.....Nov. 102
PHENOLS
Cheapest route to phenol.....Mar. 91
Which route to aniline?.....Nov. 145
PIPING
New approach to . . . Piping system weight analysis .....Apr. 195
Titanium exchanger tubing works well in refinery service.....May 105
Try improved calorized steel.....June 75
Microbiology for oil people . . . Corrosion in natural water.....Aug. 148
Mixed refrigerant for ethylene.....Oct. 129
Pipewall vibrations reveal . . . valve generated noise?.....Oct. 147
Escape piping vibrations while designing..Oct. 152
Energy price impacts designs.....Nov. 205
Choosing cold insulation for your piping and storage?.....Nov. 257
How skin effect tracing works.....Dec. 90
Quality vessel integrity with accoustic emission analysis .....Dec. 132
PLASTICIZERS
Make plasticizer alcohols this way.....Apr. 127
POLITICS
Where the candidates stand (Part 1)..May 237
POLLUTION see ENVIRONMENT
POLYESTERS
DCPD: Abundant resin raw material...Sept. 235
POLYMERIZATION
Propylene dimer: fuel or chemical.....Apr. 105
Suspension—PVC in large reactors....Nov. 117
POLYOLEFINS
Propylene dimer: fuel or chemical.....Apr. 105
POLYVINYL CHLORIDE
Mexico: Outlook for plastics?.....Aug. 165
Suspension—PVC in large reactors....Nov. 117
PRESSURE VESSELS see VESSELS
PROPYLENE see OLEFINS
PROPYLENE OXIDE
Make glycerine via peracetic acid.....Nov. 139
Make propylene oxide direct.....Nov. 102
PROTEINS
Make SCP from ethanol.....Nov. 113
PUMPS
Failure analysis of high-speed couplings..Jan. 77
Techniques for alignment of rotating equipment .....Jan. 81
A practical vibration primer (Part 5)...Apr. 171
Use keyless couplings for large compressor shafts .....Apr. 181
Vibration energy method for rotor dynamic optimization .....Nov. 261
How to avoid field problems with boiler feed pumps .....Dec. 79

REACTORS see also SPECIFIC PROCESS
Will enough steel be in our future?.....Feb. 116
For a given kinetic duty . . . Select optimum reactor quickly.....Apr. 135
Erratum .....*Aug. 69*
Refining Handbook .....Sept. 103
REFINING HANDBOOK .....Sept. 103
REFORMING
What affects cat reformer yields.....Jan. 95
Recycle H_2 in NH_3 purge gas.....Jan. 103
NPRA '75 panel views processes.....Apr. 109
To save energy when reforming.....May 75
Compare CO production methods.....May 149
Erratum .....*July 67*
Refining Handbook .....Sept. 103
Which route to olefins from VGO?.....Oct. 123
Mixed refrigerant from ethylene.....Oct. 129

REFRIGERATION
Gas men look at technical needs.....Apr. 69
Conserve energy . . . Refrigerate with waste heat .....May 173
Refining Handbook .....Sept. 103
Mixed refrigerant for ethylene.....Oct. 129
Cut costs in olefin plants.....Nov. 165
RESIDUES
Sulfur split among products.....Feb. 77
Make SNG from waste and biomass.....Apr. 76
ROSE process improves resid feed.....May 125
Metals removal for FCC catalyst.....May 133
Save crude: feed resid to FCC.....July 105
Refining Handbook .....Sept. 103
Steam crack vacuum residue.....Nov. 93
RHODIUM
Hydroformylate propylene at low pressure .....Sept. 247

SAFETY
Safety in phenol-from-cumene process...Jan. 185
Did arson cause that plant fire?.....Feb. 163
Curtail vinyl chloride exposure.....Feb. 182
Erratum .....*Mar. 71*
Oxygen gives lowest cost VCM.....Mar. 81
Air or oxygen for VCM.....Mar. 85
Nomograph helps determine static electrical charge from fluid flow.....Mar. 133
Accidents caused by reverse flow.....Mar. 187
Size up plant hazards this way.....Apr. 247
Fire losses reported by API/NFPA.....May 291
Design your plant for survival.....May 301
Ground flares aid safety.....June 175
Better plant design saves energy.....July 78
Recover energy with exchangers.....July 101
Loss prevention in the HPI (Part 1)....July 205
Loss prevention in the HPI (Part 2)....Aug. 184
Loss prevention in the HPI (Part 3)...Sept. 321
Loss prevention in the HPI (Part 4)....Oct. 215
Loss prevention in the HPI (Part 5)..Nov. 305
Case history: A two burner boiler explosion .....Dec. 85
Blanket tanks for gas control.....Dec. 101
Are you a good 'risk manager'.....Dec. 163
SEALS
Control valve packing . . . some useful guidelines .....Jan. 91
SEPARATORS see VESSELS
SHALE OILS
In situ recovery processing.....May 117
Lurgi/Ruhrgas shale oil process.....Sept. 269
SMOKE POINT
When using dimethyl sulfoxide (Part 1).Aug. 127
SOLVENT REFINING
Use solvent to separate micron-sized particles from liquid stream.....May 191
Refining Handbook .....Sept. 103
When using dimethyl sulfoxide.....Nov. 237
Spent oil reclaimed without acid.....Dec. 130
SPECIFICATIONS
Choosing cold insulation for your piping and storage?.....Nov. 257
SPILL
Oil spill control (Part 1).....Feb. 121
Oil spill control (Part 2).....Mar. 146
STACKS
Recover energy from furnace stacks.....Jan. 127
STANDARDS
Specify performance testing to . . . Improve compressor reliability.....June 135
Choosing cold insulation for your piping and storage?.....Nov. 257
STORAGE see INVENTORIES
STYRENE
Butadiene: A viable raw material?.....Feb. 95
Canada's role in petrochemicals.....Aug. 171
Benzene: Outlook through 1980.....Nov. 217
SUBSTITUTE NATURAL GAS
Make SNG from waste and biomass.....Apr. 76
Converting seaweed to SNG.....Apr. 86
Design plants using extended gas analyses .....May 177
Use mass measurement for NGL.....May 186
Prospects for marketing coal gasification byproducts .....Sept. 253
Ammonia: Coal versus gas.....Nov. 97
Syngas process converts waste to SNG.Nov. 201
SULFUR
Sulfur in world crudes.....Feb. 73
Sulfur split among products.....Feb. 77
LUCAS process cleans lean H_2S streams.Oct. 110
SULFURIC ACID
Spent oil reclaimed without acid.....Dec. 130
SYNCRUDE
Solid-phase hydrogenation cuts costs....Jan. 131
SYNTHESIS GAS
Lower olefins via Fischer-Tropsch.....Nov. 105
Hydroformylate propylene at low pressure .....Sept. 247

TAR SANDS
In situ recovery processing.....May 117
Syncrude vows environmental responsibility .....Oct. 102
TESTING see SPECIFIC EQUIPMENT OR ANALYZING
THERMODYNAMICS
What affects cat reformer yields.....Jan. 95
Solve more distillation problems (Part 5) .....Jan. 137
Improve prediction of enthalpy of fractions .....Mar. 153
Erratum .....*June 75*
Gas men look at technical needs.....Apr. 69
Better data saves energy.....May 115
Design plants using extended gas analyses .....May 177
Save time in computing density.....May 199
Erratum .....*July 67*
Solve more distillation probems (Part 6) .....June 125
What to follow if . . . your goal is effective fouling control.....July 153
More about antifoulants.....July 161
Predict heat capacity more accurately...Aug. 153
Predict VP or "undefined" fractions....Dec. 121
TOOLS
Power tools for maintenance.....Jan. 73
TRAINING
Oil spill control (Part 1).....Feb. 121
TRAPS
Steam management in a refinery.....Dec. 71
TRAYS see DISTILLATION and VESSELS
TREATING
Olefins production by gas oil cracking (Part 2C) .....Jan. 149
Sulfur split among products.....Feb. 77
Find hydrogen partial pressure.....Feb. 81
Better data for amine treating.....Feb. 87
Optimize the effluent system (Part 1)..Mar. 105
Remove carbon dioxide with Selexol....Apr. 73
Startup of a sour gas plant.....Apr. 90
NPRA '75 panel views processes.....Apr. 109
Refinery odor control.....Apr. 121
Optimize the effluent system (Part 2)..Apr. 213
Cut wastewater treatment costs.....May 92
ROSE process improves resid feed.....May 125
Metals removal for FCC catalyst.....May 133
Optimize the effluent system (Part 3)..May 221
Optimize the effluent system (Part 4)..June 115
Save crude: feed resid to FCC.....July 105
Optimize the effluent system (Part 5)...July 113
Treat propane for COS removal.....July 137
What to follow if . . . your goal is effective fouling control.....July 153
More about antifoulants.....July 161
Re-refining adds furfural stage.....Aug. 123
Optimize the effluent system (Part 6)..Aug. 137
Microbiology for oil people . . . Corrosion in natural water.....Aug. 148
Refining Handbook .....Sept. 103
Advanced wastewater treatment process is effective.....Oct. 107
LUCAS process cleans lean H_2S streams.Oct. 110
Which route to olefins from VGO?.....Oct. 123
Spent oil reclaimed without acid.....Dec. 130
TUBES see HEAT TRANSFER
TURBINES
Failure analysis of high-speed couplings..Jan. 77
Techniques for alignment of rotating equipment .....Jan. 81
How to uprate turboequipment by optimized coupling selection.....Jan. 87
New extraction control system for steam turbines .....Feb. 111
Improved hot-gas expanders for cat cracker flue gas.....Mar. 141
A practical vibration primer (Part 5)...Apr. 171
Use keyless couplings for large compressor shafts .....Apr. 181
New techniques in overcoming electrical runout .....Aug. 131
Electrical runout in rotating machinery.Aug. 133
A practical vibration primer (Part 6)...Oct. 141
Can you justify hydraulic turbines.....Oct. 163
Vibration energy method for rotor dynamic optimization .....Nov. 261
Steam management in a refinery.....Dec. 71
Electricity: generate or buy?.....Dec. 75

UREA
Clean up urea plant effluent.....Aug. 111
What's new in urea technology?.....Nov. 160
UTILITIES
Optimize the effluent system (Part 1)..Mar. 105
To save energy when reforming.....May 75
Improve crude unit operation.....May 81
Cut wastewater treatment costs.....May 92
Optimize the effluent system (Part 4)...June 115
Optimize the effluent system (Part 5)...July 113
Optimize the effluent system (Part 6)...Aug. 137
Mixed refrigerant for ethylene.....Oct. 129
How to avoid field problems with boiler feed pumps .....Dec. 79
Case history: A two burner boiler explosion .....Dec. 85
Electricity: generate or buy?.....Dec. 75
How skin effect tracing works.....Dec. 90

VACUUM
Low-pressure vapor-liquid trays.....Apr. 97
Improve crude unit operation.....May 81
VALVES
Control valve packing—some useful guidelines .....Jan. 91
VAPORIZATION
Low-pressure vapor-liquid trays.....Apr. 97
Predict VP of "undefined" fractions..Dec. 121
VEHICLES
Emission vs. conservation update.....June 93
Erratum .....*Aug. 69*
Tank truck loading optimized.....Dec. 105
VESSELS
LNG rollover . . . update.....Jan. 119
Solve more distillation problems (Part 5) .....Jan. 137
Oil spill control (Part 1).....Feb. 121
Extraction variables defined.....Mar. 117
Improved hot-gas expanders for cat cracker flue gas.....Mar. 141
Oil spill control (Part 2).....Mar. 145
Low-pressure vapor-liquid trays.....Apr. 97
Design of skirt-mounted supports.....Apr. 199
Tests quantify emissions from ship loading .....Apr. 207
New concepts for . . . Storage tank design .....May 97
Erratum .....*July 67*
Chart finds vessel thickness.....May 217
Solve more distillation problems (Part 6) .....June 125
Internal corrosion in floating roof gasoline tanks .....Aug. 145
Erratum .....*Nov. 89*
Microbiology for oil people . . . Corrosion in natural water.....Aug. 148
Adsorption for vapor control.....Sept. 241
Choosing cold insulation for your piping and storage?.....Nov. 257
A simplified approach to pressure vessel head design.....Nov. 265
Qualify vessel integrity with acoustic emission analysis .....Dec. 132
VIBRATION
Failure analysis of high-speed couplings..Jan. 77
Techniques for alignment of rotating equipment .....Jan. 81
A practical vibration primer (Part 5)...Apr. 171
A practical vibration primer (Part 6)...Oct. 141
Pipewall vibrations reveal . . . valve-generated noise? .....Oct. 147
Escape piping vibrations while designing.Oct. 152
Vibration energy method for rotor dynamic optimization .....Nov. 261
How to avoid field problems with boiler feed pumps .....Dec. 79

WASTE DISPOSAL see ENVIRONMENT
WAXES
Refining Handbook .....Sept. 103
WELDING
Prevent overlay failures: Check weld procedure execution .....May 103

CORRECTIONS for 1975 ARTICLES and HANDBOOKS
Petrochemical Handbook (Nov., 1975, Page 165).....Feb. 71
BWR applied to NG/SNG (Nov., 1975, Page 199).....Mar. 53
How to size up your company (Dec., 1975, Page 128).....Apr. 65
How to simplify fluid flow calculations (Sept., 1975, Page 197).....Aug. 69
Refining Handbook (Sept., 1976, Page 103).....Oct. 85

AUTHORS INDEX

A

Adams, J. T., Jr. ..... Apr. 207
Adlerstein, J. A. ..... Nov. 201
Albright, M. A. ..... May 115
Ames, G. W. ..... Aug. 171
Ammond, H. J. ..... Sept. 289
Anderson, K. L. ..... Aug. 119
Anderson, L. M. ..... Feb. 111
Ando, M. ..... Dec. 90
Andrews, J. W. ..... Apr. 105
Also Dec. 130
Armstrong, A. ..... Feb. 163
Artuso, B. J. ..... Nov. 271
Ashbaugh, W. G. ..... Aug. 162

B

Bac, J. ..... Nov. 151
Baehl, R. A. ..... Sept. 247
Balfoort, J. P. ..... Mar. 141
Barbier, J. C. ..... Apr. 105
Barnes, E. F. ..... July 147
Barre, C. ..... Nov. 176
Barry, W. E. ..... May 104
Barton, P. ..... Apr. 97
Bates, C. L. ..... Oct. 152
Becdelievre, C. ..... Oct. 129
Beckner, J. L. ..... Feb. 107
Beebee, D. W. ..... Aug. 131
Berger, C. V. ..... Mar. 91
Berggren, G. ..... Jan. 91
Bergman, D. F. ..... May 177
Bernhart, D. G. ..... Apr. 121
Beychok, M. R. ..... Sept. 261
Biggs, D. H. ..... Aug. 133
Bird, D. B. ..... May 105
Blau, W. ..... Mar. 97
Bloch, H. P. ..... Jan. 87
Also Apr. 181
Bolger, R. G. ..... May 113
Bonnefond, P. ..... Dec. 130
Bonnifay, P. ..... Apr .105
Bonilla, J. A. ..... Nov. 240
Bovay, H. E., Jr. ..... Sept. 288
Boyd, W. K. ..... May 104
Bressanelli, J. P. ..... June 84
Briley, G. C. ..... May 173
Britton, R. B. ..... May 81
Broodo, A. ..... Feb. 163
Brook, P. ..... Jan. 103
Brooks, R. L. ..... Feb. 116
Brosilow, C. B. ..... Mar. 127
Brown, T. D. ..... Aug. 119
Brownstein, A. M. ..... Feb. 95
Bratzler, K. ..... Oct. 110
Bussemeir, B. ..... Nov. 105

C

Calloway, J. A. ..... July 71
Campbell, J. C. ..... Dec. 97
Cano, G. G. ..... Aug. 165
Cha, B. J. ..... Apr. 105
Chahvekilian, E. ..... Nov. 176
Christensen, D. R. ..... Oct. 107
Cobb, C. B. ..... Feb. 121
Also Mar. 145
Coffee, R. D. ..... May 301
Coleman, H. J. ..... Feb. 73
Conn, B. R. ..... Oct. 107
Connor, H. ..... Sept. 247
Cornils, B. ..... Nov. 105
Costello, T. M. ..... June 84
Cox, W. R. ..... Aug. 94
Crame, L. W. ..... May 92
Crow, R. H. ..... May 95
Csikos, R. ..... July 121
Curt, R. P. ..... Mar. 137
Cushing, R. H. ..... Sept. 265
Cutler, E. T. ..... May 86

D

D'Alessandro, P. L., Jr. ..... Feb. 121
Also Mar. 145
Dalton, C. ..... Feb. 127
Dalton, M. ..... Feb. 127
Danekind, W. E. ..... Dec. 71
Datz, M. ..... Aug. 73
Davis, R. C. ..... July 165
De Maglie, B. ..... Mar. 78
Decora, A. W. ..... May 117
Desai, A. M. ..... Apr. 127
Devandran, M. ..... Aug. 127
Also Nov. 237
Dimmling, W. ..... Apr. 127
Doerflein, E. L. ..... July 96
Doerges, A. ..... Oct. 110
Douillet, D. ..... Apr. 105
Dovali Jaime, A. ..... June 58-G
Drake, E. M. ..... Jan. 119
Driver, Y. ..... May 143
Duckham, H. E. ..... July 78
Also July 101
Dumon, R. ..... Nov. 176
Duran, J. L. ..... Aug. 153

E

Eckert, J. S. ..... Mar. 117
Edison, R. R. ..... May 133
Edmondson, C. H. ..... Aug. 89
Eisenberg, B. ..... Feb. 87
Eng, M-T. ..... Nov. 125
Englin, B. A. ..... July 121

F

Fagerlund, A. C. ..... Oct. 147
Falbe, J. ..... Nov. 155
Feathers, R. E. ..... Mar. 81
Feduska, J. C. ..... Jan. 149
Feldman, H. F. ..... Nov. 201
Felton, G. W. ..... Nov. 201
Fick, J. E. ..... July 127
Fidler, R. K. ..... Aug. 111
Fidoe, H. L. ..... May 120
Fishtine, S. H. ..... Jan. 149
Fleming, J. B. ..... Jan. 185
Also July 78
Also July 101
Foo, K. W. ..... May 149
Foroulis, Z. A. ..... Aug. 145
Fowler, R. ..... Sept. 247
Fox, J. M. ..... May 119
Frampton, L. H. ..... Aug. 123
Frank, M. E. ..... Nov. 122
Franzen, J. E. ..... Nov. 134
Frayer, J. A. ..... July 105
French, E. C. ..... Aug. 147
Frohning, C. D. ..... Nov. 105
Fuge, C. ..... Nov. 165

G

Gallun, S. E. ..... Jan. 137
Gammell, D. M. ..... Dec. 101
Gans, M. ..... Mar. 73
Also Nov. 145
Garcia-Borras, T. ..... Mar. 179
Also Dec. 137
Garwin, L. ..... May 125
Gaugh, R. R. ..... June 87
Gearhart, J. A. ..... May 125
Gelbein, A. P. ..... Feb. 103
Giardina, J. A. ..... Sept. 279
Giblin, E. J. ..... Sept. 279
Gibson, K. R. ..... May 75
Gilbourne, D. ..... Oct. 129
Gilmore, J. ..... Feb. 163
Goddin, C. S. ..... July 109
Goeke, E. K. ..... Nov. 134
Grace, E. C. ..... May 120
Green, L. E. ..... May 205
Green, W. E. ..... May 110
Grimm, D. ..... Mar. 97
Grutsch, J. F. ..... Mar. 105
Also Apr. 213
Also May 221
Also June 115
Also July 113
Also Aug. 137
Guaitella, R. ..... Aug. 117
Gyger, R. F. ..... July 96

H

Hall, D. E. ..... July 109
Haluska, J. L. ..... July 153
Hamilton, R. E. ..... Oct. 70-G
Hanisian, J. ..... Nov. 151
Haring, B. ..... May 211
Haruki, H. ..... Nov. 102
Haslam, A. ..... Jan. 103
Hayden, R. ..... May 122
Hays, A. ..... Jan. 91
Hayward, G. L. ..... Jan. 149
Also Apr. 161
Henebry, W. M. ..... Oct. 87
Hess, F. E. ..... June 125
Hess, M. ..... Nov. 97
Hoffman, E. R. ..... Aug. 111
Hoffman, H. L. ..... Feb. 77
Holland, C. D. ..... Jan. 137
Also June 125
Hoving, J. ..... Aug. 161
Hyde, R. W. ..... Nov. 229
Howell, J. C. ..... Mar. 127
Hughes, R. N. ..... Dec. 163
Hughes, T. R. ..... May 75
Humphrey, R. C. ..... Oct. 201
Hyde, M. C. ..... Apr. 53-C

I

Imberman, W. ..... Oct. 168
Imgram, A. G. ..... Oct. 159
Imhausen, K-H ..... Nov. 155
Inoue, S. ..... Nov. 160
Isalski, H. ..... Jan. 103
Ishida, M. ..... Aug. 56-E
Ishii, K. ..... June 75
Ito, T. ..... June 175
Izumiyama, M. ..... June 75

J

Jackson, C. ..... Jan. 81
Also Apr. 171
Also Oct. 141
Jacobson, R. L. ..... May 75
Jelen, F. C. ..... Jan. 111
Jira, R. ..... Mar. 97
Johnson, M. M. ..... May 103
Johnson, S. C. ..... June 109
Jojima, T. ..... Nov. 160
Joseph, B. ..... Mar. 127

K

Kageyama, O. ..... Nov. 102
Also Nov. 139
Kaiser, V. ..... Oct. 129
Kaliaguine, S. ..... Aug. 153
Katell, S. ..... July 85
Katz, D. L. ..... May 177
Kawahara, H. ..... Dec. 90
Kent, R. L. ..... Feb. 87
Kesler, M. G. ..... Mar. 153
Kerdraon, L. ..... Dec. 130
Kerr, R. D. ..... Mar. 127
Kiff, B. W. ..... Nov. 247
Kiguchi, I. ..... Mar. 69
Killat, G. R. ..... Sept. 241
Killion, L. D. ..... Apr. 207
Also Oct. 94
Kimata, H. ..... Dec. 105
Kimmons, R. L. ..... Aug. 77
Klass, D. L. ..... Apr. 76
Kletz, T. A. ..... Mar. 187
Klooster, H. J. ..... Apr. 121
Knapp, H. ..... May 199
Kobrin, G. ..... Aug. 148
Kops, G. H. ..... Nov. 271
Kovacik, J. M. ..... Dec. 75
Krikke, R. H. ..... Aug. 161
Kronseder, J. G. ..... July 56-F
Kugelman, A. M. ..... Jan. 95
Kumazawa, T. ..... Mar. 69

L

Laky, J. ..... July 121
Lambrix, J. R. ..... Jan. 185
Lartique, G. J. ..... Sept. 70-E
Lawley, H. G. ..... Apr. 247
Lee, B. I. ..... Mar. 153
Leese, T. M. ..... Apr. 86
Leonard, J. H. ..... May 108
Leuteritz, G. M. ..... June 99
Lievano, R. J. ..... July 71
Logan, P. J. ..... May 217
Also Nov. 265
Longmire, D. R. ..... Nov. 179
Luger, C. R. ..... June 105
Lula, R. A. ..... June 89
Lundquist, J. A. ..... Oct. 163

M

Maeda, K. ..... June 75
Makay, E. ..... Dec. 79
Mallatt, R. C. ..... Mar. 105
Also Apr. 213
Also May 221
Also June 115
Also July 113
Also Aug. 137
Marnell, P. ..... Sept. 269
Masologites, G. P. ..... May 133
Mason, R. Z. ..... July 109
Massanti, U. G. ..... Aug. 123
Masuda, Y. ..... Nov. 113
Matsumoto, Z. ..... May 157
Matsushita, K. ..... Aug. 101
Maux, R. ..... Mar. 90
Also May 233
Mazzanti, U. G. ..... Aug. 123
McCabe, J. R. ..... May 75
McCandless, J. B. ..... Oct. 159
McClaskey, B. M. ..... Oct. 163
McCormick, R. H. ..... Apr. 97
McCulloch, D. C. ..... Feb. 81
McGrath, R. V. ..... May 97
McKinney, J. D. ..... July 105
Mehta, D. D. ..... May 165
Metcalfe, R. S. ..... Apr. 97
Meyer, W. ..... Sept. 235
Mick, M. B. ..... July 137
Moore, J. G., Jr. ..... Oct. 98
Murry, M. G. ..... Apr. 191

N

Nack, H. ..... Nov. 201
Nadkarni, R. M. ..... Nov. 229
Nakai, T. ..... Mar. 69
Nakanishi, M. ..... Nov. 113
Neale, D. F. ..... June 135
Neill, W. J. ..... Aug. 145
Nixon, J. R. ..... Jan. 185
Numa, Y. ..... Nov. 102
Numasaki, K. ..... May 157

O

O'Hara, J. B. ..... Nov. 221
Offen, M. J. ..... Oct. 123
Ondish, G. F. ..... July 105
Orr, W. P. ..... Jan. 56-E
Ostroot, G., Jr. ..... Dec. 85
Otsuka, E. ..... Nov. 160
Ozero, B. J. ..... Mar. 73

P

Paros, S. V. ..... Nov. 257
Pavletic, R. P. ..... Oct. 135
Payer, W. ..... Nov. 155
Pallay, I. ..... July 121
Palmer, D. J. ..... Dec. 121
Parry, D. L. ..... Dec. 132
Perugini, J. J. ..... July 161
Plöcker, U. J. ..... May 199
Ponder, T. C. ..... Apr. 52-FF
Also May 58-F
Also Oct. 119
Also Nov. 213
Also Nov. 217
Also Dec. 115
Pothanikat, J. J. ..... Apr. 195
Potter, W. S. ..... Apr. 161
Prather, B. V. ..... May 88
Pujado, P. R. ..... Mar. 91

Q

Quang, D. V. ..... Dec. 130

R

Radcsenko, E. D. ..... July 121
Raimbault, J. ..... Apr. 105
Ramalho, R. S. ..... Aug. 153
Raney, D. R. ..... Apr. 73
Rao, B. K. B. ..... Aug. 127
Also Nov. 237
Raudsepp, E. ..... Jan. 167
Also Feb. 143
Also May 247
Also Oct. 187
Also Nov. 279
Reber, S. A. ..... Nov. 229
Reed, R. D. ..... Jan. 127
Reich, P. ..... Mar. 85
Reimann, P. ..... June 99
Reis, T. ..... Feb. 56-E
Ring, T. A. ..... May 119
Robert, J. A. ..... July 121
Rodgers, B. R. ..... May 191
Rodriguez, F. ..... Feb. 125
Roeder, R. A. ..... Feb. 81
Rogers, F. W. ..... May 237
Also June 141
Ross, G. N. ..... Apr. 143
Ryskamp, C. J. ..... May 81

S

Sakakura, Y. ..... Nov. 113
Salazar, J. R. ..... Mar. 91
Santini, F. ..... Jan. 159
Saunby, J. B. ..... Nov. 247
Sawada, N. ..... June 175
Sawvell, L. R. ..... Mar. 165
Sayyed, S. ..... Sept. 273
Also Dec. 125
Schalver, J. ..... Oct. 110
Schmidt, B. R. ..... Oct. 112
Schoffel, F. ..... Nov. 155
Schornack, L. G. ..... May 75
Schrider, L. A. ..... May 117
Schroeder, W. C. ..... Jan. 131
Schutte, A. H. ..... Nov. 229
Serrurier, R. ..... Sept. 253
Shah, S. R. ..... Apr. 135
Sharpe, R. A. ..... Nov. 171
Shelton, E. M. ..... Feb. 73
Sherman, R. E. ..... Dec. 149
Sherwin, M. B. ..... Nov. 122
Shortland, I. ..... May 149
Siddiqi, A. A. ..... Apr. 207
Also Oct. 94
Siemssen, J. O. ..... May 133
Simmons, H. R. ..... Nov. 261
Singh, K. P. ..... Apr. 199
Skinner, A. C. ..... Oct. 135
Smit, K. ..... Aug. 161
Sohns, D. ..... Nov. 165
Spitz, P. H. ..... Apr. 143
Also July 131
Sponsler, R. G. ..... Jan. 73
Steinmeyer, D. ..... Nov. 205
Stewart, D. ..... Oct. 135
Stickles, R. P. ..... Nov. 229
Stoeberl, P. A. ..... Dec. 149
Stokes, C. A. ..... Nov. 179
Stork, K. ..... Nov. 151
Styslinger, J. R. ..... July 101
Sun, Y. C. ..... Sept. 241
Sze, M. C. ..... Feb. 103

T

Tacke, D. M. ..... Apr. 151
Talley, D. L. ..... Apr. 90
Takahashi, R. ..... Nov. 93
Takami, K. ..... Aug. 101
Taylor, R. I. ..... July 91
Templeton, R. E. ..... Aug. 83
Templeton, W. J. ..... May 186
Tenini, J. W. ..... Apr. 207
Also Oct. 94
Terwiesch, B. ..... Nov. 117
Thinh, T. P. ..... Aug. 153
Thompson, C. J. ..... Feb. 73
Thompson, R. G. ..... July 71
Thompson, S. J. ..... May 95
Thorne, H. C. ..... Apr. 151
Tost, D. ..... Oct. 102
Trigo, J. ..... Apr. 83

U

Uchiyama, T. .....Dec. 93
Also Dec. 105
Unzelman, G. H. .....June 93

V

Vergeres, P. .....June 99
Vervalin, C. H. .....Feb. 182
Also May 291
Also July 205
Also Aug. 97
Also Aug. 176
Also Aug. 182
Also Sept. 321
Also Oct. 215
Also Nov. 56-G
Also Nov. 305
Also Dec. 54-F
Also Dec. 54-JJ
Vogt, G. A. .....Apr. 121
Voris, W. .....May 265

W

Wachel, J. C. .....Oct. 152
Wade, H. L. .....May 81
Wall, J. D. .....Apr. 69
Wallace, D. M. .....Nov. 189
Washimi, K. .....Nov. 93
Wattner, K. W. .....Jan. 77
Weber, H. .....Apr. 127
Weiss, W. H. .....Apr. 235
Wenschhof, D. E. .....June 81
White, E. L. .....May 104
White, L. G. .....July 85
Wilby, L. .....Aug. 73
Wilcox, H. A. .....Apr. 86
Williams, C. C. .....May 115
Williams, M. A. .....Apr. 221
Willis, B. H. .....Oct. 87
Wilson, R. M. .....Nov. 271
Wilson, W. B. .....Dec. 75
Wimer, W. E. .....Mar. 81
Winter, O. .....Nov. 125
Wirges, H-P. .....Apr. 135
Wolfe, K. G. .....Aug. 86
Worman, R. G. .....July 180

Y

Yamagishi, K. .....Nov. 102
Also Nov. 139
Yamaguchi, M. .....Aug. 101
Yeager, J. C. .....May 273
Also June 153
Young, E. P. .....May 88

Z

Zanker, A. .....Mar. 133
Zdonik, S. B. .....Jan. 149
Also Apr. 161
Zimmer, J. C. .....Aug. 117
Zink, J. .....Nov. 155
Zoller, W. .....Nov. 155

Index reprints can be obtained by writing the Reprint Dept., *HYDROCARBON PROCESSING*, P.O. Box 2608, Houston, Tx. 77001.

Page number with letter suffix denotes International Edition only.

Special reports covered in recent years by HP

1976

December—Offsite facilities
November—Petrochemical developments
October—Environmental management
September—Refining handbook
August—Project management
July—Energy management
June—High temperature materials
May—API refining division
April—Gas processing
March—Air vs. oxygen
February—Sulfur in crude and products
January—Maintenance special report

1975

December—Pressure vessel codes
November—Petrochemical handbook
October—Environmental processes
September—Refining developments
August—Fire protection and safety
July—Energy management
June—Centrifugal compressors
May—API-World Petroleum Congress
April—Gas processing handbook
March—Synthetic detergents
February—Instrumentation
January—Maintenance report

1974

December—Lube oil processing
November—Petrochemical developments
October—Environmental management
September—Refining process handbook
August—In-plant training and development
July—Energy management
June—Valves
May—API refining division
April—Gas processing developments
March—Solids handling
February—Heavy feedstocks for ethylene
January—Maintenance

1973

December—High speed gear units
November—Petrochemical processes handbook
October—Environmental management
September—Refining developments
August—Storage facilities
July—Energy management
June—Manpower development
May—API refining division
April—Gas Processing handbook
March—Reactor design
February—Engine fuel quality
January—Maintenance